

Benefits to Industry of
Environmental Auditing

Little (Arthur D.), Inc., Cambridge, MA

Prepared for

Environmental Protection Agency, Washington, DC

Aug 83



**Report to
U.S. Environmental
Protection Agency
August 1983**

**Benefits to Industry
of Environmental Auditing**

 **Arthur D. Little, Inc.**
Center for Environmental Assurance
EPA No. EPA-230-08-83-005

REPRODUCED BY
**NATIONAL TECHNICAL
INFORMATION SERVICE**
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA-230-08-83-005	2.	3. RECIPIENT'S ACCESSION NO. PB85 240422 WAS
4. TITLE AND SUBTITLE Benefits to Industry of Environmental Auditing	5. REPORT DATE August 1983	
	6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Arthur D. Little, Inc Center for Environmental Assurance	8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Arthur D. Little, Inc Center for Environmental Assurance 15 Acorn Park Cambridge, MA 02140	10. PROGRAM ELEMENT NO. AHD: S5A	
	11. CONTRACT/GRANT NO. 68-01-6160	
12. SPONSORING AGENCY NAME AND ADDRESS EPA. Office of Policy, Planning and Evaluation Regulatory Reform Staff, PM-223 401 M Street, SW Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED final	
	14. SPONSORING AGENCY CODE 300/00	
15. SUPPLEMENTARY NOTES		
16. ABSTRACT This report identifies principal objectives of environmental auditing programs and analyzes expected benefits to firms adopting environmental auditing. Benefits are categorized in terms of two main effects: (1) increased management effectiveness; and (2) increased management comfort or security that the company is meeting its legal, corporate and ethical requirements. Measures to evaluate those effects are identified.		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS (This Report) unclassified	21. NO. OF PAGES 20
	20. SECURITY CLASS (This page) unclassified	22. PRICE

INSTRUCTIONS

1. **REPORT NUMBER**
Insert the EPA report number as it appears on the cover of the publication.
2. **LEAVE BLANK**
3. **RECIPIENTS ACCESSION NUMBER**
Reserved for use by each report recipient.
4. **TITLE AND SUBTITLE**
Title should indicate clearly and briefly the subject coverage of the report, and be displayed prominently. Set subtitle, if used, in smaller type or otherwise subordinate it to main title. When a report is prepared in more than one volume, repeat the primary title, add volume number and include subtitle for the specific title.
5. **REPORT DATE**
Each report shall carry a date indicating at least month and year. Indicate the basis on which it was selected (e.g., date of issue, date of approval, date of preparation, etc.).
6. **PERFORMING ORGANIZATION CODE**
Leave blank.
7. **AUTHOR(S)**
Give name(s) in conventional order (John R. Doe, J. Robert Doe, etc.). List author's affiliation if it differs from the performing organization.
8. **PERFORMING ORGANIZATION REPORT NUMBER**
Insert if performing organization wishes to assign this number.
9. **PERFORMING ORGANIZATION NAME AND ADDRESS**
Give name, street, city, state, and ZIP code. List no more than two levels of an organizational hierarchy.
10. **PROGRAM ELEMENT NUMBER**
Use the program element number under which the report was prepared. Subordinate numbers may be included in parentheses.
11. **CONTRACT/GRANT NUMBER**
Insert contract or grant number under which report was prepared.
12. **SPONSORING AGENCY NAME AND ADDRESS**
Include ZIP code.
13. **TYPE OF REPORT AND PERIOD COVERED**
Indicate interim final, etc., and if applicable, dates covered.
14. **SPONSORING AGENCY CODE**
Insert appropriate code.
15. **SUPPLEMENTARY NOTES**
Enter information not included elsewhere but useful, such as: Prepared in cooperation with, Translation of, Presented at conference of, To be published in, Supersedes, Supplements, etc.
16. **ABSTRACT**
Include a brief (200 words or less) factual summary of the most significant information contained in the report. If the report contains a significant bibliography or literature survey, mention it here.
17. **KEY WORDS AND DOCUMENT ANALYSIS**
 - (a) **DESCRIPTORS** - Select from the Thesaurus of Engineering and Scientific Terms the proper authorized terms that identify the major concept of the research and are sufficiently specific and precise to be used as index entries for cataloging.
 - (b) **IDENTIFIERS AND OPEN-ENDED TERMS** - Use identifiers for project names, code names, equipment designators, etc. Use open-ended terms written in descriptor form for those subjects for which no descriptor exists.
 - (c) **COSATI FIELD GROUP** - Field and group assignments are to be taken from the 1965 COSATI Subject Category List. Since the majority of documents are multidisciplinary in nature, the Primary Field/Group assignment(s) will be specific discipline, area of human endeavor, or type of physical object. The application(s) will be cross-referenced with secondary Field/Group assignments that will follow the primary posting(s).
18. **DISTRIBUTION STATEMENT**
Denote releasability to the public or limitation for reasons other than security for example "Release Unlimited." Cite any availability to the public, with address and price.
19. & 20. **SECURITY CLASSIFICATION**
DO NOT submit classified reports to the National Technical Information service.
21. **NUMBER OF PAGES**
Insert the total number of pages, including this one and unnumbered pages, but exclude distribution list, if any.
22. **PRICE**
Insert the price set by the National Technical Information Service or the Government Printing Office, if known.

NOTICE

This report has been prepared by Arthur D. Little, Inc., under contract No. 68-01-6160 for the Regulatory Reform Staff, Office of Policy and Resource Management, U.S. Environmental Protection Agency. The report reflects the findings and conclusions of the author and not necessarily those of EPA or any other government entity.

BENEFITS TO INDUSTRY OF ENVIRONMENTAL AUDITING

ABSTRACT

This paper identifies the principal objectives of environmental audit programs, identifies the major parties affected by the establishment of an auditing program, and, based on these, outlines some performance measures which can be used to assess the benefits of environmental auditing to industry. Some performance measures will lead to quantifiable results, others to qualitative impacts. Some benefits will stem from the direct influence of the audit program; others will flow only indirectly. While the perceived benefits of environmental auditing vary both among companies and among individuals within a corporation, the most significant benefits to industry of environmental auditing fall into two broad categories: increased environmental management effectiveness and a feeling of increased comfort or security.

INTRODUCTION

As companies have developed environmental auditing programs in recent years, more information has become available for those interested in developing an auditing capability. Although a growing body of literature describes what environmental auditing is and how it is used in the private sector, little has been written describing its benefits. Environmental auditing may benefit EPA, industry, the general public, labor, and other groups, as well as the environment. The scope of this paper, however, is limited to the potential benefits to industry of environmental auditing.

Generally speaking, a benefit can be defined as something that aids or promotes well-being, or otherwise contributes to an improvement in condition. Implicit in this definition is a judgment of "well-being" that, although somewhat constrained by cultural norms, basically rests in the experience of an individual. For the purposes of this analysis, we define benefits more specifically to include those aspects and outputs of voluntary private-sector environmental auditing that significantly and positively contribute to the achievement of corporate objectives.

The achievement of corporate objectives is based on contributions and activities at many levels and can be measured in many ways. In general, however, corporate objectives relate in some way to maintaining or improving the long-term competitive viability of the firm. Within the scope of benefits to industry, three important issues influence the description of environmental auditing benefits:

- *How to characterize environmental auditing benefits?* Benefits can be limited to those derived specifically and solely from environmental auditing, or expanded to include all those benefits of environmental management to which environmental auditing contributes.

- *What defines environmental auditing?* There is not, as yet, a universally accepted definition of environmental auditing; therefore, what one company perceives as a benefit of environmental auditing, another may categorize as a benefit of its environmental compliance management (and not auditing) programs.
- *Whose perspective?* Different companies undertake the development of an environmental auditing program for different reasons; as a result, what is perceived as a benefit by individuals in one company may not at all be perceived as a benefit by those in another company. Moreover, the perception of some attribute or outcome of the audit program as a benefit varies from person to person within a corporation. The views of the plant manager are generally very different from those of the corporate environmental staff or top management.

For the purposes of this analysis, we answer the first question by limiting benefits to those for which environmental auditing is the principal source or to which auditing significantly contributes. Responding to the second question, we define environmental auditing as a methodical examination involving analyses, tests, and confirmations of facility procedures and practices leading to a verification of their compliance with legal requirements, internal policies, and/or accepted practices. With regard to the third question posed above, because many different perspectives of environmental auditing currently exist in the private sector, the scope of this study is intentionally broad to encompass these many different views.

While the perceived benefits of environmental auditing vary both among companies and among different individuals within a corporation, most of the more widely acknowledged benefits do fall into two basic categories: increased environmental management effectiveness and a feeling of increased comfort or security that the company's potential exposure to regulatory compliance problems is being reduced. In order to explore these two categories in some depth, the sections that follow present a context for analysis of environmental auditing benefits; identify the range of environmental audit program effects which may be perceived as benefits; identify the parties affected by the audit program; and identify the measures which may be used to evaluate audit program effects.

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)		
1. REPORT NO. EPA-230-08-83-005	2.	3. RECIPIENT'S ACCESSION NO. PB85 240422 LAS
4. TITLE AND SUBTITLE Benefits to Industry of Environmental Auditing	5. REPORT DATE August 1983	
	6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Arthur D. Little, Inc Center for Environmental Assurance	8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Arthur D. Little, Inc Center for Environmental Assurance 15 Acorn Park Cambridge, MA 02140	10. PROGRAM ELEMENT NO. AHD: S5A	11. CONTRACT/GRANT NO. 68-01-6160
12. SPONSORING AGENCY NAME AND ADDRESS EPA. Office of Policy, Planning and Evaluation Regulatory Reform Staff, PM-223 401 M Street, SW Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED final	14. SPONSORING AGENCY CODE 300/00
15. SUPPLEMENTARY NOTES		
16. ABSTRACT This report identifies principal objectives of environmental auditing programs and analyzes expected benefits to firms adopting environmental auditing. Benefits are categorized in terms of two main effects: (1) increased management effectiveness; and (2) increased management comfort or security that the company is meeting its legal, corporate and ethical requirements. Measures to evaluate those effects are identified.		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS (This Report) unclassified	21. NO. OF PAGES 20
	20. SECURITY CLASS (This page) unclassified	22. PRICE

016 223 005
Little (Arthur D.), Inc., Cambridge, MA, Center for
Environmental Assurance.

FB85-240422

Report to
U.S. Environmental
Protection Agency
August 1983

Benefits to Industry of Environmental Auditing

CONTEXT FOR THE BENEFITS ANALYSIS

The benefits to industry of environmental auditing are as wide and varied as the objectives of audit programs. In order to provide a context for defining the benefits to industry of environmental auditing, it is useful to examine the techniques that have been used in other types of benefit analyses and assess the inherent limitations of those techniques as they apply to this study.

Link to Cost/Benefit Analyses

Cost/benefit analysis has been used in a variety of forms and levels of sophistication in both the public and private sectors. Formal cost/benefit analysis in the public arena is a technique designed to promote regulatory and investment decisions which provide net benefits to a society as a whole. In this case, it is important to define the society carefully in order to include all significant effects of the decision or investment. Some effects will be benefits, others will be costs on the whole, and different individuals may view the same effect as benefits or costs.

Formal cost/benefit analyses generally use aggregate measures of welfare, i.e., the sum of a society's well-being. The most common measures include GNP or consumer surplus as the basic economic monetary measure of benefits (or costs). The general benefits analysis proceeds in several steps: categorization of all identifiable effects of a given activity; conversion of these effects into benefits; conversion of the implicit value of these benefits into a common set of units or metrics (generally dollars); discounting future benefits (or costs); and summing everything in terms of present value.

Less formal cost/benefit analyses often crop up as a result of procedures set forth in statutes or legal precedents which require, without much specificity, that benefits must outweigh or be commensurate with costs. This informal setting for benefits reflects a more pragmatic, less analytic connotation and leaves the process of balancing to the decision maker's judgment.

In the private sector, a form of cost/benefit analysis is used in investment decisions. Conventional discounted cash flow (DCF) or return on investment (ROI) analyses, with target or hurdle levels, are an analog to formal cost/benefit analysis in the public arena.

Inherent Limitations of Benefits Analyses

While various forms of cost/benefit analysis have been used in both the public and private sectors, there are a number of inherent limitations of such analyses which we believe are particularly important in this study of environmental auditing benefits.

- *Questions of Definition*

When the framework on which benefits are being identified and evaluated shifts from society to other organizations, such as corporations, several questions of definition arise. What is the collection of individuals whose well-being is affected by the procedure, in this case voluntary environmental auditing? What responsibilities for others are assumed by decision makers in weighing the costs and benefits of an action or, pragmatically, whose well-being is considered at what levels? Who provides information for the decision makers?

- *Reliance on Individual Judgment*

In the absence of conventional aggregate measures of well-being within a single corporation, benefits depend entirely on individual judgments and will reflect on the corporate organization hierarchy. This reliance on individual judgment, which is generally the case with the benefits of environmental auditing, greatly increases the inherent difficulty of the benefits analysis.

- *Qualitative Nature of Audit Benefits*

Many of the effects and benefits associated with voluntary private-sector environmental auditing are difficult, if not impossible, to quantify. It is no easy task to determine the value of an increased feeling of comfort or security a corporate officer may feel as a result of having implemented an environmental auditing program. Nevertheless, just because something is not measurable does not mean that it has no benefit.

Despite these limitations, it is possible to identify the potential benefits to industry of environmental auditing. While environmental auditing does not fit into the conventional financial analysis framework, the potential benefits of voluntary environmental auditing can be identified by an approach embodying parts of analogs to the formal benefits analysis process. Quantification of these potential benefits is a much more difficult and subjective task that is beyond the scope of this initial study.

IDENTIFICATION OF AUDIT PROGRAM EFFECTS

Corporations undertake environmental auditing programs for a variety of reasons, ranging from providing assurance to top management that systems are in place and operating effectively to assessing the hazards and risks to which the company is exposed. Table 1 lists commonly found audit program objectives. Generally speaking, environmental audit programs differ by the driving force behind the program, by the role the audit program plays in the corporation's overall approach to environmental management, by the degree of compliance verification, and by the level of involvement of different functions within the organization. As a consequence of these differences, a variety of audit program objectives are commonly found. It is important to recognize that these objectives are often competing and conflicting in terms of the role of the audit team, the audit methodology, and the type of audit reporting required; thus, it is highly unlikely that all, or even most, would be found as objectives of any given audit program.

It is important to distinguish among the objectives, benefits, and effects of environmental auditing. An *objective* of an audit program is an end toward which effort is directed over a period of time. A *benefit* (to a company) of auditing is something resulting from achieving the objective which imputes a higher value to the corporation. In short, companies work toward achieving audit program objectives so that they can gain the resulting value or benefit. In a benefits analysis, it is common practice to assume that all or part of the objectives have been accomplished; thus, for the purposes of this study, the audit program objectives listed in Table 1 are considered as audit program *effects*. While audit program effects can be perceived as either costs or benefits, Table 1 does not include those environmental audit program effects (e.g., human resources required) which are generally categorized as costs.

This distinction is important because the objectives of audit programs are commonly used in industry as the benefits, per se. For example, a typical audit program objective is to identify and document compliance status. The benefit is really not identification and documentation of compliance status, but rather may be increased environmental management effectiveness as measured by such things as an improved compliance record, reduced occupational hazards, fewer legal actions brought against the company, etc. In this example, identification and documentation of compliance status are an effect of implementing the audit program, not the benefit.

TABLE 1

**PRINCIPAL OBJECTIVES OF
ENVIRONMENTAL AUDITING PROGRAM**

- Identification and documentation of compliance status, including:
 - Compliance discrepancies;
 - Differences or shortcomings at individual facilities; and
 - Patterns of deficiencies that may emerge over time.
- Improvement in overall environmental performance at the operating facilities as a result of:
 - Providing an incentive not to allow problems to happen again;
 - Reducing or containing problems that can interfere with normal business activity; and
 - Providing an incentive to clean up/improve housekeeping before an upcoming audit.
- Assistance to facility management in:
 - Understanding and interpreting regulatory requirements, company policies and guidelines, and (perhaps) good practices;
 - Identifying compliance problems;
 - Defining cost-effective measures that should be taken to achieve compliance; and
 - Putting potential problems before a "committee of experts."
- An increase in the overall level of environmental awareness as a result of:
 - Demonstrating top management commitment to environmental compliance;
 - Increasing the environmental awareness at the facility;
 - The training accrued to the audit team; and
 - Involving employees in environmental, health, and safety issues.

TABLE 1 (Continued)

**PRINCIPAL OBJECTIVES OF
ENVIRONMENTAL AUDITING PROGRAMS**

- Acceleration of the overall development of environmental management and control systems as a result of:
 - Auditing those systems that are "auditable";
 - Defining the status of those activities that are not yet in a position to be audited;
 - Identifying important lessons learned and modifying systems and/or sharing information as appropriate;
 - Encouraging formulation of more formal procedures and standards for measuring environmental performance; and
 - Developing a data base of information on environmental performance which can be used in other management functions.
- Improvement of the environmental risk management system as a result of:
 - Identifying conditions that may have an adverse impact on the company;
 - Assessing the risks associated with the hazardous conditions identified; and
 - Determining what actions are necessary to control those risks.
- Corporate protection from potential liabilities as a result of:
 - Being able to demonstrate due diligence/evidence of the corporate environmental commitment;
 - Soliciting an independent (third-party) opinion;
 - Documenting evidence demonstrating that the company is complying with regulations; and
 - Developing improved relations with regulators.
- Development of a basis for optimizing resources as a result of:
 - Identifying current and anticipated costs and recommending ways to reduce those costs;
 - Identifying potential longer-term savings which can be accrued; and
 - Identifying potential opportunities to reduce waste generation.

MEASURES FOR BENEFITS

In converting the effects listed in Table 1 to benefits, it is useful to repeat the statement made above that companies work toward achieving objectives so that they can gain the resulting value or benefit. Audit program effects become benefits by applying some form of performance measure to the effect. Application of performance measures implies that the effects have to be measurable and worth measuring.

A benefit of auditing has been defined as an aspect or output of voluntary private-sector auditing that contributes significantly and positively to the achievement of corporate objectives. It is important to recognize that the principal corporate objectives tend to be described in very broad terms such as competitive position, market share, growth, stock price, etc. In most companies, these measures are driven largely by non-environmental factors; thus, environmental auditing, in most instances, does not influence these measures significantly. Nevertheless, a number of specific measures — some quantifiable and some non-quantifiable — can be applied to the audit program effects listed in Table 1.

Thus, in order to identify the potential benefits to industry of environmental auditing, we can look at various measures of corporate well-being. Table 2 provides some examples of measures which might be used to evaluate audit program effects. The table distinguishes between those measures commonly considered to be directly influenced by the audit program and those not directly influenced. In addition, Table 2 categorizes each measure as being either generally quantifiable or generally non-quantifiable. As discussed above, Table 2 does not include some common quantifiable measures of corporate performance (e.g., return on investment) or individual performance (e.g., compensation) because these are not generally affected significantly by environmental audit programs. That is, activities, actions, and programs other than environmental auditing are likely to significantly influence or drive the performance measured. Table 3 shows how the effects listed in Table 1 correspond to the different direct measures (both quantifiable and non-quantifiable) listed in Table 2.

TABLE 2
EXAMPLE MEASURES WHICH MAY POSSIBLY BE USED
TO EVALUATE AUDIT PROGRAM EFFECTS

Directly Influenced by Audit Program	Generally Quantifiable	Generally Not Quantifiable
Improved compliance record	✓	
Reduced legal actions brought against company and/or individuals	✓	
Reduced fines	✓	
Improved incident/accident statistics	✓	
Reduced volume of environmental hazards	✓	
Improved worker health	✓	
Improved reputation		✓
Favorable publicity		✓
Improved regulatory relations		✓
Indirectly Influenced by Audit Program		
Decrease in business interruptions by identifying problems that could affect production	✓	
Increased worker productivity from reduced environmental risks	✓	
Reduced insurance rate	✓	
Increased involvement in day-to-day environmental activities		✓
Increased job satisfaction		✓
Knowledge of job performance measures		✓
Feeling supported by management		✓

TABLE 3

APPLICATION OF PERFORMANCE MEASURES
TO AUDIT PROGRAM EFFECTS

Measure Effect	Generally Quantifiable						Generally Non-Quantifiable		
	Improved Compliance Record	Reduced Legal Action	Reduced Fines	Improved Incident/Accident Statistics	Reduced Environmental Hazards	Improved Worker Health	Improved Reputation	Favorable Publicity	Improved Regulatory Relations
Identification and documentation of compliance status	X	S	S	X	S	S			
Improvement in overall environmental performance at the operating facilities	X	X	X	X	X	X	S	X	S
Assistance to facility management	X	X	X	X	X	X	S	S	S
An increase in the overall level of environmental awareness	X			X	S		S	X	
Acceleration of the overall development of environmental management and control systems	S	S	S	X	X	S			
Improvement of the environmental risk management system	X			X	X	X			
Corporate protection from potential liabilities	X	S		X	X	X	S		S
Development of a basis for optimizing resources	S		S		S				

- X = Generally applicable
 S = Situational
 □ = Generally not applicable

IDENTIFICATION OF PARTIES AFFECTED

In order to evaluate the benefits to industry of environmental auditing, we need to identify the key parties affected by the establishment of an auditing program. By "industry," we essentially mean "a company," and we can think of a company both as a corporate entity and as a collection of individuals. An example of a benefit to the corporate entity might be improved company reputation. On the other hand, a benefit to a senior officer might be a feeling of increased comfort or security. The key individuals potentially benefited by an environmental audit program are listed below.

- Stockholders
- Board members
- Corporate officers
- Corporate environmental management
- Legal department
- Manufacturing manager
- Plant manager
- Plant environmental staff
- Line supervisors
- Hourly workers

Others who might be added to the list include customers, neighbors, and other members of the general public who may potentially benefit from an environmental auditing program.

Ultimately, the benefits to a company of environmental auditing are defined by a combination of the corporate benefits and the net sum of the benefits to the various individuals. Again, however, each of the individuals listed above has a different measure of value, so, for example, what is perceived as a benefit to a corporate officer is generally different from what a plant manager would call a benefit. Table 4 outlines which of the measures commonly applied directly to environmental audit programs are most likely to be perceived by which individuals as potential benefits. Table 5 provides a similar analysis for a sample of measures which are, as a rule, not applied directly to audit programs.

TABLE 4

MEASURES DIRECTLY INFLUENCED BY THE AUDIT PROGRAM

Parties Affected Measures										
	Stockholders	Board	Corporate Officers	Corporate Environmental Management	Legal	Manufacturing Manager	Plant Manager	Plant Environmental Staff	Line Supervisors	Hourly Workers
Quantifiable										
Improved compliance record		S	S	X	X	S	X	X	S	
Reduced number of legal actions	X	X	X	X	X	S	X			
Reduced fines			S	X	X	S	X	X		
Improved incident/accident statistics		S	S	X	S	S	X	X		
Reduced volume of environmental hazards				S		X	X	X	X	X
Improved worker health							X	X	X	X
Not Quantifiable										
Improved reputation	X	X	X	X	X	X	X	X	X	X
Favorable publicity	X	X	X	X	S	X	X	X	X	X
Improved regulatory relationships			S	X	X		X	X		

- X = Generally applicable
 S = Situational
 □ = Generally not applicable

TABLE 5

MEASURES NOT DIRECTLY INFLUENCED BY THE AUDIT PROGRAM

Parties Affected Measures	Stockholders	Board	Corporate Officers	Corporate Environmental Management	Legal	Manufacturing Manager	Plant Manager	Plant Environmental Staff	Line Supervisors	Hourly Workers
Quantifiable										
Decrease in business interruptions	X	X	X	X	S	X	X	X		
Increased worker productivity resulting from reduced environmental risk			S			X	X	X	X	X
Reduced insurance rate				X	S	S	S			
Not Quantifiable										
Increased involvement in day-to-day activities		S	S	X		S	X	X		
Increased job satisfaction				X				X		
Knowledge of job performance measures				X			X	X		
Feeling supported by management				X			S	S		

- X = Generally applicable
 S = Situational
 □ = Generally not applicable

BENEFITS OF AUDITING

Several patterns emerge from this analysis of audit program effects and the performance measures which might be used to evaluate those effects. First, as Table 3 shows, the performance measures which most naturally apply to the various program effects are generally quantifiable (e.g., improved compliance record, improved incident/accident statistics, etc.). Second, as Table 4 shows, individuals who are higher up in the organization (e.g., corporate officers and Board members) tend to evaluate the audit program by measures which are generally non-quantifiable (e.g., improved reputation or favorable publicity). The quantifiable measures likely to be of significant importance to top management (e.g., reduced number of legal actions) are not commonly influenced directly by the audit program. As a result of these two patterns, we can conclude that operational managers such as the corporate environmental manager or plant manager generally view the benefits of auditing in ways that may be quantifiable, while top management views the benefits in more subjective ways. Thus, the most significant benefits to industry of environmental auditing can be classified into two broad categories: increased environmental management effectiveness and a feeling of increased comfort or security. Table 6 shows which audit program effects contribute to achieving these two categories of benefits.

Principal Categories of Benefits

1. Increased Environmental Management Effectiveness

A significant number of the audit program effects listed in Table 1 contribute toward increasing the overall environmental management effectiveness of the corporation. This increased effectiveness results from identifying and reducing "blind spots" that may exist, clarifying issues that might otherwise be interpreted differently at different facilities, and developing a more uniform approach to managing environmental activities through sharing information and learning from other facilities.

As shown in Table 3, increased environmental management effectiveness can, to some extent, be quantitatively measured over time. Some basic measures include an improved compliance record, improved incident/accident statistics, and some index of the volume and size of legal actions. However, there are likely to be significant limitations to using such measures to evaluate management effectiveness. Some measures of improved environmental management effectiveness, such as an improved reputation or favorable publicity, are generally not quantifiable.

TABLE 6
CLASSIFICATION OF AUDIT PROGRAM BENEFITS

Principal Categories of Benefits Audit Program Effects	Increased Environmental Management Effectiveness	Feeling of Increased Comfort
Identification and documentation of compliance status	●	●
Improvement in overall environmental performance at the operating facilities	●	●
Assistance to facility management	●	●
An increase in the overall level of environmental awareness	●	●
Acceleration of the overall development of environmental management and control systems	●	●
Improvement of the environmental risk management system	●	●
Corporate protection from potential liabilities		●
Development of a basis for optimizing resources	●	

-  Primary
 Secondary

2. Feeling of Increased Comfort or Security

Many environmental auditing programs are established at the request of top management for the purpose of identifying and documenting the compliance status of individual facilities. The primary benefit of such programs is to provide top management with a sense of increased comfort or security that the company's potential exposure to regulatory compliance problems is being reduced. This benefit is commonly perceived more by those who feel liability (e.g., top management) than by those who feel risk (e.g., plant management). The feeling of comfort is generally non-quantifiable and stems from the knowledge that operations are consistent with good practice, that control systems are in place and operating, and that legal and ethical responsibilities are being met.

Link to the Overall Environmental Management System

As mentioned at the beginning of this paper, the benefits analyzed are those for which environmental auditing is the principal source or to which auditing significantly contributes. Environmental auditing is universally recognized as one component of the overall corporate environmental management system, and there is an inherent difficulty in trying to measure the benefits of one component of a system. Many of the objectives audit programs strive to meet are also objectives of other environmental management activities. As a result, the benefits of increased comfort or security are driven by a variety of efforts, of which environmental auditing is a very important one.

CONCLUSIONS

While the benefits of environmental management in general and environmental auditing in particular are difficult to assess, this paper has focused on showing that there are ways to begin to explicitly categorize what those benefits are and who they are perceived by.

The benefits to industry of environmental auditing are as wide and varied as the underlying reasons for which companies develop environmental auditing programs. While the perceived benefits of environmental auditing vary both among companies and among different individuals within a corporation, it is nevertheless possible to identify — and to a limited extent measure — the benefits of auditing.

The benefits to industry of environmental auditing basically fall into two broad categories: increased environmental management effectiveness and a feeling of increased comfort or security. The role of environmental auditing in achieving these benefits is extremely difficult to measure because many other factors typically contribute to their achievement. Nevertheless, we have found that however difficult the benefits are to quantify, those companies with established environmental audit programs feel strongly that the benefits are substantial. As a result, the number of companies with environmental audit programs continues to increase.